Occurrence of Perithecia of Gibberella sp. on Carnation

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ABSTRACT

Perithecia of *Gibberella* sp. were found on carnation in Pennsylvania in 1969. Single ascospore cultures produced macroconidia typical of *Fusarium roseum* 'Graminearum'. The perithecia were found primarily at the base of dead plants. Occurrence of perithecia was associated with a severe outbreak of the stub dieback phase of *Fusarium* stem rot, and may be related to recent changes in carnation culture. Phytopathology 61:743-744.

Additional key words: Dianthus caryophyllus.

The *Gibberella* perfect stage of *Fusarium roseum* (Lk.) emend. Snyd. & Hans. 'Graminearum' was found on carnation, *Dianthus caryophyllus* L., in a commercial greenhouse at Chalfont, Pa., during the study of a severe outbreak of the stub dieback phase of *Fusarium* stem rot. Single ascospore cultures, made at the time of the initial discovery of perithecia in the fall of 1969, yielded cultures which produced macroconidia typical of Graminearum (Fig. 1). These cultures were homothallic, and produced perithecia within 7 days on propylene oxide-sterilized (2) carnation leaves in 2% water agar. Perithecia have been found regularly during the course of monthly surveys carried out since the first discovery, and single ascospore cultures have always yielded macroconidia typical of Graminearum.

Blue-black perithecia of *Gibberella* sp. were found at the base of the plants within 5 cm of the soil line. They were generally formed in cortical cracks of the stem (Fig. 2). Occasionally, perithecia were also found higher on the plants at stem nodes, but only during the winter months (Fig. 3). Perithecia were found only on dead branches or dead plants. They have never been found on living plant tissue.

The presence of perithecia was associated with a severe outbreak of the stub dieback phase of *Fusarium* stem rot on 2- to 3-year-old carnation plants. Damage occurred as a dieback of stubs after flower harvest. In some cases, the fungus grew from the stub into the main stem or sidebreak, reducing the number of flower shoots and the productivity of the plant (Fig. 4). Occasionally the fungus grew into the main stem and girdled it, causing death of the plant. Hellmers (3) reported that the cultivars Culmorum (*F. culmorum*) and Avenaceum (*F. avenaceum*) of *F. roseum* caused stub dieback in Denmark. Isolations from infected stub tissues from Pennsylvania consistently yielded cultures of *F. roseum* 'Graminearum'. No other cultivars of *F. roseum* were isolated. Ejected ascospores are apparently the primary inoculum, and infect plants through fresh wounds made during flower harvest.

Carnation cuttings, cultivar Improved White Sim, were planted in a steam-treated mix of equal parts peat, perlite, and soil in 6-inch pots and allowed to flower. Flowers were harvested and the freshly cut stubs inoculated with a drop of a spore suspension in sterile distilled water prepared from isolates of *F. roseum* 'Graminearum' grown on potato-dextrose agar slants at 21-22 C. Isolates were obtained from air samples and infected stubs from the Chalfont greenhouse. Within 5 months, inoculated stubs were killed to the soil line, a distance of 10-18 cm, and perithecia had formed around the base of the stub at the soil line. Single ascospore cultures from these perithecia yielded cultures of *F. roseum* 'Graminearum'.

This is the first report, to our knowledge, of the occurrence of perithecia of *Gibberella* sp. on carnation. The occurrence of perithecia may be related to changes in cultural practices used in the carnation industry. In the past several years, fertilization practices have been modified so that nitrogen levels in the plant remain high and plants are kept in a succulent, active growing state. Stem rot may occur more frequently in carnation plants supplied with a high level of nitrogen (1). The use of fan- and pad-cooling systems results in higher relative humidity than would occur in an uncooled greenhouse and thus favors disease development (4). We are currently investigating the epidemiology of this disease.

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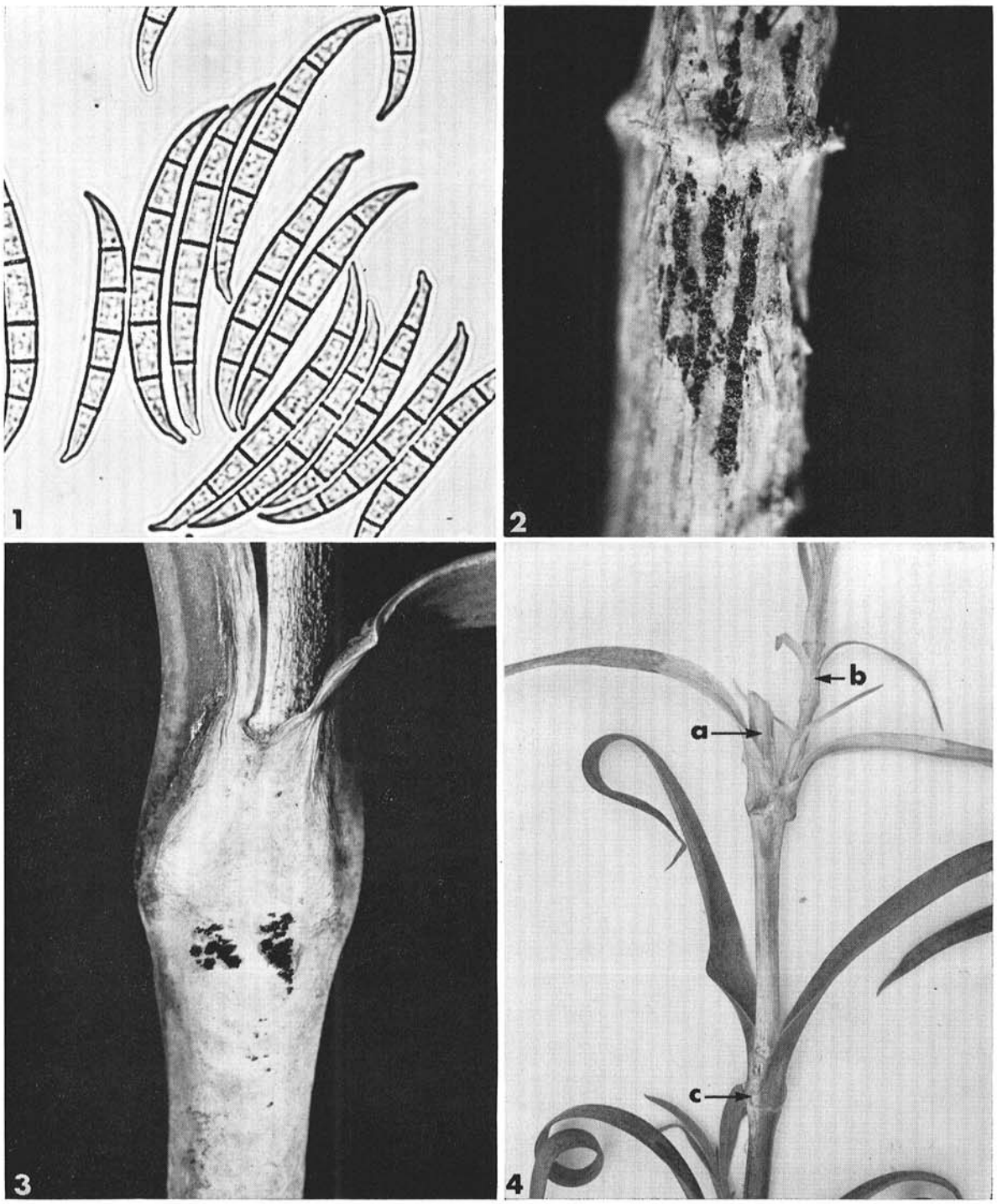

Fig. 1-4. **1)** Macroconidia of *Fusarium roseum* 'Graminearum' produced in a single ascospore culture from perithecia of *Gibberella* sp. on carnation, *Dianthus caryophyllus*. (×950) **2)** Perithecia of *Gibberella* sp. produced in cortical cracks at the base of the stem of a dead carnation plant. **3)** Perithecia of *Gibberella* sp. produced just below the node on a dead carnation stem. **4)** Portion of a carnation stem showing stub dieback (a); girdling of the side break (b); and dieback of the stem below the stub (c).